

Serial No. 10/657,179
Amdt. Dated February 16, 2005
Reply to Office Action of November 17, 2004

Docket No. MRE-0063

REMARKS/ARGUMENTS

Claims 1-34 are pending in this application. By this Amendment, the specification and claims 1 and 21 are amended. Support for the claims can be found throughout the specification, including the original claims, and the drawings. Withdrawal of the rejections in view of the above amendments and the following remarks is respectfully requested.

I. Allowable Subject Matter

The Examiner is thanked for the indication that claims 14-17 would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. However, for the reasons set forth below, claims 14-17 have not been rewritten in independent form at this time.

II. Rejection Under 35 U.S.C. §102(b)

The Office Action rejects claims 1-13 and 18-33 under 35 U.S.C. §102(b) as anticipated by Burward-Hoy, U.S. Patent No. 5,977,785 (hereinafter "Burward-Hoy"). The rejection is respectfully traversed. It appears it was the Examiner's intention to also reject claim 34 under 35 U.S.C. §102(b) over Burward-Hoy. Thus, for purposes of this reply, it is assumed that the rejection also applies to claim 34.

Independent claim 1 recites, *inter alia*, at least one cooling fluid spraying unit configured to spray the cooling fluid supplied through the cooling fluid flow passage toward faces of modular ICs in an oblique direction with respect to a central plane of the at least one cooling fluid spraying unit. Burward-Hoy neither discloses nor suggests such features, or the claimed combination.

Burward-Hoy discloses an apparatus for varying an operating temperature of a semiconductor device under test (DUT) 115. Referring, for example, to Figs. 2A-2B of Burward-Hoy, the DUT 115 is inserted into a test socket 128 of a test head 129 of a piece of Automated Test Equipment (ATE) 105 by an insertion effector 126, and testing is carried out at an appropriate temperature. The DUT 115 maintains thermal contact with a heating and cooling apparatus (HCA) 130, and the DUT 115 is heated and/or cooled to an appropriate test temperature based on a temperature of the HCA 130 and the heat exchange operation performed due to the thermal contact formed between mating surfaces of the DUT 115 and the HCA 130. Referring, for example, to Fig. 3 of Burward-Hoy, the HCA 130 includes a plate 140 that is heated and cooled by a heat exchanger 145, and may also include a contacting test material 150 to improve thermal contact between the DUT 115 and the plate 140. Temperature of the DUT 115 is controlled by controlling flow rates of heat transfer fluids which flow through the heat exchanger 145. These heat transfer fluids are heated or cooled by equipment 155 which

also controls the flow of these fluids into the heat exchanger 145 along the arrows shown in Figure 3 (see also column 4, lines 23 of Burward-Hoy).

Burward-Hoy teaches that a desired temperature in the plate 140 is achieved using the nominal temperatures associated with different heat transfer fluids and varying the flow rates of each fluid accordingly as it is circulated through the heat exchanger 145 (see column 5, lines 13-40 of Burward-Hoy). Burward-Hoy clearly discloses that these heat transfer fluids flow through channels formed in the heat exchanger 145, and that temperature of the DUT 115 is controlled through a heat transfer operation conducted based on a surface temperature of the plate 140 which contacts the DUT 115. Burward-Hoy does not disclose or suggest a cooling fluid spraying unit which sprays the cooling fluid supplied through the cooling fluid flow passage toward the DUT 115. Rather, the heat transfer fluid simply flows through the channels formed in the heat exchanger 145.

Burward-Hoy discloses additional embodiments of a heat exchanger 165 in Figures 4A-4C. The first of these heat exchangers 165 includes a hot inlet 170, a hot outlet 175, a cold inlet 180, a cold outlet 185, and a closed loop (not shown) which allows the equipment 155 to regulate a flow of hot and cold heat transfer fluids so as to regulate a temperature of the plate 140. In Figure 4B, the heat exchanger 165 includes first channels 190 and second channels 195 separated by conductive walls 196 which promote rapid exchange of heat between hot and cold fluids. This interdigitation of the channels 190 and 195 reduces thermal gradients and promotes uniform temperatures across the surface of the plate 140, thus more accurately controlling the heat transfer operation between the plate 140 and the DUT 115. In Figure 4C, the plate 140 acts as a lid for covering the interdigitated channels 190 and 195, allowing the plate 140 direct contact

with the heat transfer fluids and a more concentrated heat exchange operation between the opposite surface of the plate 140 and the DUT 115.

In each of the embodiments disclosed by Burward-Hoy, the heat transfer fluids are directed into and flow through channels contained within the heat exchanger to heat/cool the plate, and a heat transfer operation is conducted between the device under test and the plate due to the thermal contact formed between adjacent surfaces of the device and the plate. Burward-Hoy does not disclose or suggest a cooling fluid spraying unit which sprays cooling fluid toward faces of modular ICs, as recited in independent claim 1, let alone that the cooling fluid is sprayed in an oblique direction with respect to a central plane of the cooling fluid spraying unit.

Accordingly, it is respectfully submitted that independent claim 1 is not anticipated by Burward-Hoy, and thus the rejection of independent claim 1 under 35 U.S.C. §102(b) over Burward-Hoy should be withdrawn. Rejected dependent claims 2-13 and 18-20, as well as objected to claims 14-17, are allowable at least for the reasons discussed above with respect to independent claim 1, from which they depend, as well as for their added features.

Independent claim 21 recites, *inter alia*, at least one cooling fluid spraying unit configured to spray the cooling fluid supplied through the cooling fluid flow passage toward faces of modular ICs in an oblique direction with respect to a central plane of the at least one cooling fluid spraying unit. As set forth above, Burward-Hoy neither discloses nor suggests such features.

Accordingly, it is respectfully submitted that independent claim 21 is not anticipated by Burward-Hoy, and thus the rejection of independent claim 21 under 35 U.S.C. §102(b) over Burward-Hoy should be withdrawn. Dependent claims 22-31 are allowable at least for the reasons discussed above with respect to independent claim 21, from which they depend, as well as for their added features.

Independent claim 32 recites, *inter alia*, at least one cooling fluid spraying unit configured to be supported by the at least one supporting member so as to be interposed between the plurality of push bars of the press unit and configured to spray the cooling fluid supplied through the cooling fluid flow passage toward modular ICs connected to the test sockets of the handler. As set forth above, Burward-Hoy neither discloses nor suggests at least one cooling fluid spraying unit, let alone a cooling fluid spraying unit supported by at least one supporting member so as to be interposed between a plurality of push bars.

Accordingly, it is respectfully submitted that independent claim 32 is not anticipated by Burward-Hoy, and thus the rejection of independent claim 32 under 35 U.S.C. §102(b) over Burward-Hoy should be withdrawn. Dependent claims 33-34 are allowable at least for the reasons discussed above with respect to independent claim 32, from which they depend, as well as for their added features.

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III. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, Carol L. Druzbeck, at the telephone number listed below. Favorable consideration and prompt allowance are earnestly solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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